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STATE OF CALIFORNIA
WATER RESOURCES CONTROL BOARD
DIVISION OF DRINKING WATER

TO: Bear Mountain RV Park Water System (System No. 1503629)

Attn: Scott Connelly, Owner
Bear Mountain RV Park
16501 South Union
Bakersfield, CA 93307

CERTIFIED MAIL

**CITATION FOR VIOLATION OF CALIFORNIA CODE OF REGULATIONS,
TITLE 22, SECTION 64426.1(b)(2) - WATER SYSTEM NO. 1503629**

September 2015

C I T A T I O N N O. 03_19_16C_005

Issued on January 13, 2016

STATEMENT OF FACTS

Bear Mountain RV Park Water System (hereinafter Water System) is classified as a non-transient, non-community Water System and serves a population of approximately 350 persons through 167 service connections.

The Water System operates under the authority of a domestic water supply permit (No. 03-19-08P-004) issued on January 23, 2008, by the California Department of Public Health (CDPH).

1 The Southern California Drinking Water Field Operations Branch, Division of
2 Drinking Water (hereinafter Division), State Water Resources Control Board
3 (hereinafter State Board), is responsible for enforcing the Safe Drinking Water Act and
4 regulations promulgated pursuant thereto. The Division of Drinking Water was
5 transferred from the California Department of Public Health to the State Board,
6 effective July 1, 2014.

7
8 Section 116650 of the California Health and Safety Code authorizes the issuance of a
9 citation to a public water system for violation of the California Safe Drinking Water
10 Act (Health and Safety Code, Division 104, Part 12, Chapter 4, commencing with
11 Section 116270) (hereinafter "California SDWA"), or any regulation, standard, permit
12 or order issued or adopted thereunder.

13
14 The State Board, acting by and through its Division of Drinking Water and the Deputy
15 Director for the Division (hereinafter "Deputy Director"), hereby issues a citation to
16 Bear Mountain RV Park Water System (mailing address: 16501 South Union Avenue,
17 Bakersfield, CA 93307) for violation of California Code of Regulations (CCR), Title
18 22, Section 64426.1 subsection (b)(2).

- 19
- 20 • The Water System collects one (1) routine distribution system bacteriological
21 sample per quarter in accordance with its approved Bacteriological Sample
22 Siting Plan.
 - 23 • One (1) routine bacteriological quality sample collected on September 28,
24 2015, from the distribution system, tested positive for total coliform bacteria.
 - 25 • On October 5, 2015, a customer of the Water System contacted the State Board
26 regarding a Boil Water Notice (BWN) that was posted. Upon contacting Mr.
27

1 Carlos Lara with the Water System, the State Board learned of the positive
2 total coliform sample and discussed the BWN that had been issued to the
3 customers without any consultation or notification to the State Board. The
4 State Board determined that the BWN was unnecessary and directed the Water
5 System to remove the BWN and to collect the required number of repeat
6 samples from the distribution system and the Ground Water Rule sample from
7 Well 01, in response to the positive total coliform sample.
8

- 9 • One (1) out of the four (4) repeat bacteriological quality samples collected on
10 October 5, 2015, from the distribution system, tested positive for total coliform
11 bacteria.
- 12 • **Bear Mountain RV Park Water System failed the total coliform maximum**
13 **contaminant level (MCL) for September 2015 [Section 64426.1(b)(2),**
14 ***Authorities*].**
- 15
- 16 • The Water System failed to collect the repeat bacteriological quality samples
17 within 24 hours of receipt of notification of the routine total coliform positive
18 sample [[Section 64424(a)(1), *Authorities*].
- 19
- 20 • One (1) bacteriological quality sample collected on October 5, 2015, from Well
21 01, for compliance with the Ground Water Rule, tested negative for total
22 coliform bacteria.
- 23 • After providing emergency disinfection and flushing, one (1) special sample
24 collected on October 12, 2015, from the distribution system, tested negative for
25 total coliform bacteria.
26
27

- 1 • It is noted that emergency disinfection and flushing was provided without the
2 supervision of a certified distribution operator. Due to this, the Water System
3 failed to comply with the requirement of utilizing a certified distribution
4 operator to make decisions related to the emergency disinfection and flushing
5 of the distribution system and to investigate water quality problems in the
6 distribution system [Section 63770(b)(1) and Section 63770(d(2),
7 *Authorities*].
8
- 9 • On October 30, 2015, four (4) routine bacteriological samples collected from
10 the distribution system, tested negative for total coliform bacteria.
11
- 12 • None of the samples collected in September or October 2015 showed the
13 presence of *E.coli* bacteria.
14
- 15 • On November 3, 2015, a public notice and *Certification of Completion of*
16 *Public Notification* were emailed to the Water System, for the September 2015
17 total coliform MCL failure.
18
- 19 • On December 2, 2015, the State Board received signed and dated copies of the
20 public notice and *Certification of Completion of Public Notification*.
21 According to these documents, public notification was completed on
22 November 3, 2015.
23
- 24 • On November 3, 2015, an investigation report was emailed to the Water
25 System, for the September 2015 total coliform MCL failure.
26
- 27 • On December 2, 2015, the State Board received a copy of the competed
investigation report. The investigation report was completed by Mr. Lara.
According to the investigation report, a possible cause of contamination may

be due to a missing anti-siphon valve on the hosebib in the laundry room,
which was later installed and the area was flushed.

- Results of all (source and distribution) bacteriological samples collected from January 2015 to October 2015 are summarized in **Attachment A**.

AUTHORITIES

Section 116577 of the CHSC, states in relevant part:

"(a) Each public water system shall reimburse the State Board for the actual costs incurred by the State Board for any of the following enforcement activities related to that water system:

- (1) Preparing, issuing, and monitoring compliance with, an order or citation.
- (2) Preparing, and issuing public notification

"(b) The State Board shall submit an invoice for these enforcement costs to the public water system that requires payment prior to September 1 of the fiscal year following the fiscal year in which the costs were incurred. The invoice shall indicate the total hours expended, the reasons for the expenditure, and the hourly cost rate of the State Board. The costs set forth in the invoice shall not exceed the total actual costs to the State Board of the enforcement activities specified in this section."...

Section 116650 of the CHSC, states in relevant part:

"(a) If the State Board determines that a public water system is in violation of this chapter or any regulation, permit, standard, citation, or order issued or adopted thereunder, the State Board may issue a citation to the public water system. The citation shall be served upon the public water system personally or by certified mail. Service shall be deemed effective as of the date of personal service or the date of receipt of the certified mail. If a person to whom a citation is directed refuses to accept delivery of the certified mail, the date of service shall be deemed to be the date of mailing.

(b) Each citation shall be in writing and shall describe the nature of the violation or violations, including a reference to the statutory provision, standard, order, citation, permit, or regulation alleged to have been violated.

(c) A citation may specify a date for elimination or correction of the condition constituting the violation.

(d) A citation may include the assessment of a penalty as specified in subdivision (e).

(e) The State Board may assess a penalty in an amount not to exceed one thousand dollars (\$1,000) per day for each day that a violation occurred, and for each day that a violation continues to occur. A separate penalty may be assessed for each violation."

Section 116655 of the CHSC, states in relevant part:

(a) Whenever the State Board determines that any person has violated or is violating this chapter, or any permit, regulation, or standard issued or adopted pursuant to this chapter, the director may issue an order doing any of the following:

- (1) Directing compliance forthwith.
- (2) Directing compliance in accordance with a time schedule set by the State Board.
- (3) Directing that appropriate preventive action be taken in the case of a threatened violation.

(b) An order issued pursuant to this section may include, but shall not be limited to, any or all of the following requirements:

- (1) That the existing plant, works, or system be repaired, altered, or added to.
- (2) That purification or treatment works be installed.
- (3) That the source of the water supply be changed.
- (4) That no additional service connection be made to the system.

(5) That the water supply, the plant, or the system be monitored.

(6) That a report on the condition and operation of the plant, works, system, or water supply be submitted to the State Board.

California Code of Regulations (hereinafter, CCR), Title 22, Section 64423, Table 64423-A establishes the minimum routine sampling requirements, and states in relevant part:

<i>Monthly Population Served</i>	<i>Service Connections</i>	<i>Minimum Number of Samples</i>
25 to 1000	15 to 400	1 per month
1,001 to 2,500	401 to 890	2 per month
2,501 to 3,300	891 to 1,180	3 per month
3,301 to 4,100	1,181 to 1,460	4 per month
4,101 to 4,900	1,461 to 1,750	5 per month
4,901 to 5,800	1,751 to 2,100	6 per month
5,801 to 6,700	2,101 to 2,400	7 per month
6,701 to 7,600	2,401 to 2,700	2 per week
7,601 to 12,900	2,701 to 4,600	3 per week
12,901 to 17,200	4,601 to 6,100	4 per week
17,201 to 21,500	6,101 to 7,700	5 per week
21,501 to 25,000	7,701 to 8,900	6 per week
25,001 to 33,000	8,901 to 11,800	8 per week
33,001 to 41,000	11,801 to 14,600	10 per week
41,001 to 50,000	14,601 to 17,900	12 per week
50,001 to 59,000	17,901 to 21,100	15 per week

CCR, Title 22, Section 64424 establishes the repeat sampling requirements, and states in relevant part:

"(a) If a routine sample is total coliform-positive, the water supplier shall collect a repeat sample set as described in paragraph (a)(1) within 24 hours of being notified of the positive result. The repeat samples shall all be collected within the same 24 hour time period. A single service connection system may request that the State Board allow the collection of the repeat sample set over a four-day period.

(1) For a water supplier that normally collects more than one routine sample a month, a repeat sample set shall be at least three samples for each total coliform-positive sample. For a water supplier that normally collects one or fewer samples per month, a repeat sample set shall be at least four samples for each total coliform-positive sample.

(2) If the water supplier is unable to collect the samples within the 24-hour time period specified in subsection (a) or deliver the samples to the laboratory within the 24 hours after collection because of circumstances beyond its control, the water supplier shall notify the State Board within 24 hours. The State Board will then determine how much time the supplier will have to collect the repeat samples."

CCR, Title 22, Section 64426.1 establishes the total coliform maximum contaminant level and states in relevant part:

"(a) Results of all samples collected in a calendar month pursuant to Sections 64423, 64424, and 64425 that are not invalidated by the State Board or the laboratory shall be included in determining compliance with the total coliform MCL. Special purpose samples such as those listed in 64421(b) and samples collected by the water supplier during special investigations shall not be used to determine compliance with the total coliform MCL.

(b) A public water system is in violation of the total coliform MCL when any of the following occurs:

- (1) For a public water system which collects at least 40 samples per month, more than 5.0 percent of the samples collected during any month are total coliform-positive; or
- (2) For a public water system with collects fewer than 40 samples per month, more than one sample collected during any month is total coliform-positive; or
- (3) Any repeat sample is fecal coliform-positive or E. coli-positive; or

(4) Any repeat sample following a fecal coliform-positive or E. coli-positive routine sample is total coliform-positive.

(c) If a public water system is not in compliance with paragraphs (b)(1) through (4), during any month in which it supplies water to the public, the water supplier shall notify the State Board by the end of the business day on which this is determined, unless the determination occurs after the State Board office is closed, in which case the supplier shall notify the State Board within 24 hours of the determination. The water supplier shall also notify the consumers served by the water system. A Tier 2 Public Notice shall be given for violations of paragraphs (b)(1) or (2), pursuant to section 64463.4. A Tier 1 Public Notice shall be given for violations of paragraphs (b)(3) or (4), pursuant to section 64463.1."

CCR, Title 22, Section 63770 establishes the distribution system staff certification requirements, and states in relevant part:

"(b) Water systems shall utilize only certified distribution operators to make decisions addressing the following operational activities:

- (1) Install, tap, re-line, disinfect, test and connect water mains and appurtenances.
- (2) Shutdown, repair, disinfect and test broken water mains.
- (3) Oversee the flushing, cleaning, and pigging of existing water mains.
- (4) Pull, reset, rehabilitate, disinfect and test domestic water wells.
- (5) Stand-by emergency response duties for after hours distribution system operational emergencies.
- (6) Drain, clean, disinfect, and maintain distribution reservoirs.

(d) Water systems shall utilize either certified distribution operators or treatment operators to make decisions addressing the following operational activities:

- (1) Determine and control proper chemical dosage rates for wellhead disinfection and distribution residual maintenance.
- (2) Investigate water quality problems in the distribution system."

DETERMINATIONS

Based upon the above *Statement of Facts and Authorities*, the State Board has determined that the Bear Mountain RV Park Water System has violated the following:

1. CCR, Title 22, Section 64426.1(b)(2); Specifically, the Water System violated the total coliform MCL for September 2015, when more than one sample collected in September 2015, tested positive for total coliform bacteria.
2. CCR, Title 22, Section 64424(a)(1); Specifically, the Water System failed to collect the repeat samples within 24 hours of receipt of notification of the routine total coliform positive sample collected on September 28, 2015. Repeat samples were not collected until October 5, 2015.
3. CCR, Title 22, Section 63770(b)(1); Specifically, Water System failed to utilize a certified distribution operator to make decisions related to providing

1 emergency disinfection and flushing of the distribution system following the
2 total coliform MCL failure for September 2015.

- 3 4. CCR, Title 22, Section 63770(d)(2); Specifically, the Water System failed to
4 utilize a certified distribution operator to make decisions related to
5 investigation of water quality problems in the distribution system when the
6 Water System failed the total coliform MCL for September 2015.

7 The above violations are classified as non-continuing violations.

8
9 **DIRECTIVES**

10 Bear Mountain RV Park Water System is hereby directed to take the following actions:

- 11 1. Cease and desist from failing to comply with Section 116555(a) of the
12 California Health and Safety Code (CHSC) and Sections 64424(a)(1),
13 64426.1(b)(2), 63770(b)(1), and 63770(d)(2) of Title 22, California Code of
14 Regulations.
- 15 2. In the future, the Water System shall collect the required number of repeat
16 bacteriological quality samples within 24 hours of receipt of notification of a
17 routine total coliform positive sample.
- 18 3. In the future, the Water System shall utilize a certified distribution operator to
19 make decisions related to providing emergency disinfection treatment and
20 flushing of the distribution system and investigation of water quality problems
21 in the distribution system.
- 22 4. By **February 15, 2016**, the Water System shall prepare and submit an
23 emergency chlorination plan (ECP) to the State Board for review and approval.
24 Guidance for preparing an ECP is provided under **Attachment B**.
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1 5. Any document requested by the citation shall be submitted to the following
2 address:

3 Jaswinder S. Dhaliwal, P.E., Senior Sanitary Engineer
4 State Water Resources Control Board, Division of Drinking Water
5 4925 Commerce Drive, Suite 120
6 Bakersfield, CA 93309

7 6. The Water System shall reimburse the State Board, in accordance with an
8 invoice that shall be provided to the Water System, the costs for enforcement
9 activities, and such reimbursement shall be made prior to September 1 (or by a
10 different date if specified by the State Board) of the fiscal year following the
11 fiscal year in which such costs are incurred as described in CHSC Sections
12 116577(a)(1-2) and 116577(b).

13 FURTHER ENFORCEMENT ACTIONS

14 Section 116270, Chapter 4, Part 12, Division 104 of the CHSC authorizes the State
15 Board to: issue additional citations with assessment of penalties if a public water
16 system continues to fail or correct a violation identified in a citation; take action to
17 suspend or revoke a permit that has been issued to a public water system if the system
18 has violated applicable law or regulations or has failed to comply with orders of the
19 State Board; and petition the superior court to take various enforcement measures
20 against a public water system that has failed to comply with orders of the State Board.
21 The State Board does not waive any further enforcement action by issuance of this
22 citation.

23 PARTIES BOUND

24 This citation shall apply to and be binding upon Bear Mountain RV Park Water
25 System, its officers, directors, agents, employees, contractors, successors, and
26 assignees.
27

SEVERABILITY

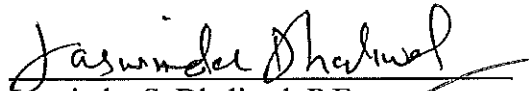
The directives of this citation are severable, and Bear Mountain RV Park Water System shall comply with each and every provision thereof, notwithstanding the effectiveness of any other provision.

CIVIL PENALTIES

Section 116650, subsections (d) and (e) of the CHSC allow for the assessment of a civil penalty for failure to comply with the requirements of the Safe Drinking Water Act. Failure to comply with any provision of this Citation may result in the State Board imposing an administrative penalty in an amount not to exceed one thousand dollars (\$1,000) per day as of the date of violation of any provision of this Citation.

Jan. 13, 2016

Date



Jaswinder S. Dhaliwal, P.E.

Senior Sanitary Engineer

Drinking Water Field Operations Branch

Certified Mail No. 7015 1520 0000 4433 1587

ATTACHMENTS

Attachment A: Summary of Bacteriological Samples Collected from January 2015 – October 2015

Attachment B: Guidance for Preparing an Emergency Chlorination Plan

CC: Kern County Environmental Health Services Department (w/o attachments)
Carlos Lara, General Manager, Bear Mountain RV Park (via email)

JSD/dc

Attachment A

Bear Mountain R V Park

1503629

Distribution System Freq: 1/Q

<i>Sample Date</i>	<i>Time</i>	<i>Location</i>	<i>T Coli</i>	<i>E Coli</i>	<i>F Coli</i>	<i>Type</i>	<i>Cl2</i>	<i>Violation</i>	<i>Comment</i>
1/13/2015	10:00	Laundry Room	A	A		Routine			
3/30/2015	14:00	Office	A	A		Routine			
4/27/2015	15:00	Laundry Room	A	A		Routine			
6/11/2015	12:50	Laundry Room	A	A		Routine			
7/30/2015	9:40	Manager's House	A	A		Routine			
9/28/2015	11:30	Laundry Room	P	A		Routine			
10/5/2015	10:40	Space #145	A	A		Repeat			
10/5/2015	10:45	Space #9	A	A		Repeat			
10/5/2015	10:50	Space #165	A	A		Repeat			
10/5/2015	10:55	Laundry Room	P	A		Repeat		MCL	Cit. #03-19-16C-005 Issued.
10/30/2015	9:12	Space #160	A	A		Routine			
10/30/2015	9:18	Space #75	A	A		Routine			
10/30/2015	9:22	Space #91	A	A		Routine			
10/30/2015	9:29	Space 9	A	A		Routine			

Bear Mountain R V Park

1503629

Source Monitoring Freq:

<i>Sample Date</i>	<i>Time</i>	<i>Source</i>	<i>T Coli</i>	<i>E Coli</i>	<i>F Coli</i>	<i>Violation</i>	<i>Comment</i>
10/5/2015	10:35	Well 01	A	A			Ground Water Rule S

ATTACHMENT B

State Water Resources Control Board
Division of Drinking Water

**Emergency Chlorination Plan Guidance (July 2014)
for
Public Water Systems**

The purpose of this Emergency Chlorination Plan (ECP) is to assist utilities implement emergency chlorination. The guidance provided below is designed to facilitate the installation of emergency chlorination equipment and to assist in the setting of chemical dosage in order to maintain acceptable free chlorine residual needed to insure public health protection immediately after a disaster. Items which should be obtained prior to the onset of a disaster include the following equipment:

1. Emergency chlorination units.
2. Chlorine residual test kits (preferably DPD)
3. Granular Calcium Hypochlorite, 65% available chlorine, (liquid sodium hypochlorite has a relatively short shelf life so it is advisable that it not be purchased in advance). Chemicals used for emergency chlorination must be approved under ANSI/NSF¹ Standard 60 (direct additives).

Installation Procedures

A utility should not wait until an emergency has occurred before it attempts to install its emergency chlorination equipment. It is advisable that all field maintenance staff be familiar with the installation procedures in order to quickly install the emergency chlorination equipment. The remainder of this plan addresses the use of hypochlorinators in the event of an emergency. For those utilities which use gas chlorination units, they should already be familiar with their operation if they are using this type of equipment.

The chlorination equipment purchased by the utility must be adequately sized for the proposed installation. The feed capacity of the hypochlorinator should allow the utility to does at a minimum of 5 parts per million free chlorine residual. After the emergency chlorination units have been physically connected to the wells and/or other sources in question, refer to the attached table or use the following procedures to calculate the appropriate settings. If you are unable to perform these calculations, contact a staff of the Drinking Water Program immediately.

The attached tables may be used to mix a solution of a known strength. Decide on a solution strength that you wish to use and find the amount of chlorine needed for a 100 gallon barrel from Table 1.

Table 2 can be used to determine the volume of solution to be added for different flow rates for each mg/L of chlorine dosage. It should be recognized that large capacity wells will need stronger solution strengths or the feed barrel will need to be filled too frequently. The volumes in table 2 are in gallons per day (gpd). If the feed pump capacity is given in gallons per hour, then the volume from Table 2 must be divided by 24 to give a gph value.

To determine the appropriate pump setting, the value from Table 2 must be divided by the feed pump capacity.

Example:

Feed Pump Capacity = 10 gph; Q = 1500 gpm; 7% solution; 5 mg/L dosage

From table 2 → Chlorine Volume = 30.9 gpd for each mg/L.

For 5 mg/L → $5 \times (30.9) = 154.5$ gpd

Since feed pump has a maximum capacity of 10 gph, the appropriate length of stroke setting is:

$$\frac{154.5 \times 24}{10 \text{ gph}} = 0.64$$

Outlined below are the equations to use if the Tables are not used:

1. A solution barrel of a known volume must be obtained. The barrel should be filled with a known volume of water. To this volume, a known weight of chemical should be added. The solution strength must be determined using the equation given below:

$$\% \text{ solution} = \frac{\text{Weight of chemical added to solution barrel (lbs)}}{\text{Weight of water in solution barrel (lbs)}} \times 100$$

(1 gallon of water weighs 8.34 lbs)

A 6% solution can be obtained by adding one half pound of chemical per gallon of water using a 100 gallon barrel. (see below):

$$50 / (100 \times 8.34 \text{ lb/gal of water}) \times 100 = 5.99 \text{ or } 6\%$$



used to get percentage

To calculate the pounds per hour of chemical that must be added to obtain a known chlorine concentration, the following equation must be used:

Equation #1:

$$\text{lbs per hour of chemical} = 8.34 \times \text{desired dosage in ppm} \times \text{flow rate in gpm} \times 60 \text{ min/1,000,000}$$

Assuming the desired dosage is 5 ppm that gives the following equation:

Equation #2: lbs per hour of chemical = 2.5×10^{-3} x flow rate in gpm

Next you must determine the required gallons per hour of chemical to be added. This must be obtained using the following equation:

Equation #3:

gallons per hour of chemical = lbs per hour / 8.34 / solution strength / 100 (from above)

Once this value has been obtained, then the next step is to review the maximum feed rate in gallons per day of the chemical feed pump. This is generally printed in a label attached to the pump and it may specify the discharge pressure this maximum rate applies to. Most chemical feed pumps have either a length of stroke setting or two settings for frequency of stroke and length of stroke. To determine what settings should be used, a review of the instrumentation on the pump must be conducted.

If two control settings are provided, then set the frequency control at 100% and provide adjustment only to the length of stroke adjustment. The equation to be used to determine at what setting the length of stroke should be, is given below:

Percent length of stroke = gallons per hour (obtained above) x 24 x 100 / the pump capacity in gpd

This numerical setting should be used when adjusting the pump. If both pump settings are to be changed from 100%, then the percent stroke equation is as follows:

Percent length of stroke = gallons per hour x 24 x 100 / stroke frequency / pump capacity in gpd

A check on the actual dosage can be performed by using the total gallons of solution pumped within a known operating period. That information can be used as follows:

Actual Dosage = $\frac{\text{gallons of solution} \times \text{solution strength}}{\text{gallons of water treated in MG}}$

An easier way to use hypochlorination equipment is to have calibration or volumetric feed cylinders installed on the intake line to the pump. If these cylinders are available, then a known volume of solution can be pumped and the time it takes to pump that volume is used to determine gallons per hour at a known discharge pressure. The actual percent solution must still be known to conduct the other calculations.

Once a utility has implemented emergency chlorination of their system, it is important to conduct follow up distribution chlorine residual monitoring to determine the effectiveness of the chlorination process. In the event of an emergency, hypochlorination equipment should be used to dose the system at 2 ppm of free chlorine residual. Chlorine residual monitoring within the distribution system should take place to verify that an adequate residual is being obtained at all locations within the distribution system. Any areas which have suppressed chlorine residuals should receive further investigation to determine whether or not there are other problems associated with the reduced residuals.

Flushing should be provided if possible, to draw the chlorinated water into the distribution system as soon as possible.

In addition to the chlorine residual monitoring, bacteriological sampling of the distribution system in all areas should be conducted. Chlorine residual monitoring in addition to bacteriological sampling should be used to further define areas of distribution system that need additional investigation. Chlorination of the system should continue until it has been verified that no structural problems exist within the distribution system and all bacteriological monitoring shows that there is no presence of pathogenic organisms.

TABLE 1
AMOUNT OF CHLORINE PER 100 GALLON BARREL*

Type of Chlorine	Solution Strength	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%
5% Sodium Hypochlorite**		60 gal	80 gal	100 gal								
12.5% Sodium Hypochlorite**		24 gal	32 gal	40 gal	48 gal	56 gal	64 gal	72 gal	80 gal	88 gal	96 gal	
65% Calcium Hypochlorite***		38 lbs	51 lbs	64 lbs	77 lbs	90 lbs	103 lbs	116 lbs	128 lbs	141 lbs	167 lbs	

* Add the quantity indicated to the 100 gallon barrel and then fill the remaining volume with water.

** The sodium hypochlorite must be ANSI/NSF¹ certified for potable drinking water and approved as direct additive (ANSI/NSF Standard 60).

1: American National Standard Institute (ANSI) or National Sanitation Foundation (NSF)

*** HTH, tablets or granular chlorine

Example: For 10% solution using 12.5% sodium hypochlorite, use 80 gallons of sodium hypochlorite and add 20 gallons of water.

Example: For 10% solution using 65% available Calcium Hypochlorite $[Ca(OCl)_2]$, use 128 lbs of granular chlorine and add water to fill barrel and mix.

TABLE 2
CHLORINE VOLUME REQUIRED GALLONS PER DAY (GPD) PER MG/L OR PPM OF DESIRED CHLORINE DOSAGE*

Flow Rate	Solution Strength	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%
50 gpm		2.4	1.8	1.4	1.2	1.03	0.9	0.8	0.7	0.7	0.6	0.6
75 gpm		3.6	2.7	2.0	1.8	1.5	1.4	1.2	1.0	1.0	0.9	0.8
100 gpm		4.8	3.6	2.9	2.4	2.0	1.8	1.6	1.4	1.3	1.2	1.1
300 gpm		14.4	10.8	8.6	7.2	6.2	5.4	4.8	4.3	3.9	3.6	3.3
500 gpm		24.0	18.0	14.4	12.0	10.3	9.0	8.0	7.2	6.6	6.0	5.5
800 gpm		38.4	28.8	23.0	19.2	16.5	14.4	12.8	11.5	10.5	9.6	8.9
1000 gpm		48.0	36.0	28.0	24.0	20.6	18.0	16.0	14.4	13.1	12.0	11.1
1500 gpm		72.0	54.0	21.5	36.0	30.9	27.0	24.0	21.6	19.6	18.0	16.6
2000 gpm		96.0	72.0	57.6	48.0	41.1	36.0	32.0	28.8	26.2	24.0	22.2

* Values in the Table are the flow rates in gallons of solution per day that be added for each mg/L of desired dosage.

Example: Well Discharge = 1,000 gpm
Solution Strength = 5%
Desired Dosage = 5 mg/L or 5 ppm

From Table 2, Need to add 28.8 gpd per mg/L (or ppm)
Therefore, 5 mg/L x 28.8 gpd/(mg/L) = 144 gpd.